

EchoStar-16 DBS CONUS Link Budgets

(QPSK Normal Mode)

Link Parameters		New York	Los Angeles	Miami
Link Geometry:				
Tx E/S Range to Satellite	(km)	39,023	39,023	39,023
Rx E/S Range to Satellite	(km)	37,683	39,663	36,877
Uplink (per carrier):				
Carrier Frequency	(MHz)	17,500	17,500	17,500
Tx E/S Antenna Diameter	(m)	13.2	13.2	13.2
Tx E/S Power to Antenna	(dBW)	8.0	8.0	8.0
Tx E/S Antenna Gain	(dB)	65.8	65.8	65.8
Tx E/S EIRP per Carrier	(dBW)	73.8	73.8	73.8
Atmospheric and Other Losses	(dB)	0.3	0.3	0.3
Free Space Loss	(dB)	209.1	209.1	209.1
Satellite:				
G/T towards Tx E/S	(dB/K)	11.7	11.7	11.7
Peak EIRP	(dBW)	55.1	55.1	55.1
EIRP towards Rx E/S	(dBW)	52.5	53.1	54.3
Downlink (per carrier):				
Carrier Frequency	(MHz)	12,500	12,500	12,500
Atmospheric Losses	(dB)	0.1	0.1	0.1
Free Space Loss	(dB)	205.9	206.3	205.7
Rain Attenuation	(dB)	4.1	4.4	5.6
Rx E/S Antenna Diameter	(m)	0.45	0.45	0.45
Antenna Mis-pointing Error	(dB)	0.30	0.30	0.30
Rx E/S Antenna Gain	(dB)	34.0	34.0	34.0
Rx E/S G/T	(dB/K)	13.2	13.2	13.2
Noise Temperature - Clear Sky	(K)	120	120	120
Noise Temperature - Rain	(K)	294	301	325
Total Link:				
Noise Bandwidth	(dB-Hz)	73.8	73.8	73.8
(C/N) - Thermal Uplink	(dB)	30.9	30.9	30.9
(C/N) - Thermal Downlink - Clear Sky	(dB)	14.2	14.3	16.2
(C/N) - Thermal Downlink - Rain Down	(dB)	6.2	5.9	6.2
(C/I) - Adjacent Satellite Interference	(dB)	23.0	23.1	25.0
(C/I) - Other Link Degradations	(dB)	27.0	27.0	27.0
(C/N) - Clear Sky	(dB)	13.4	13.5	15.2
(C/N) - Rain Down	(dB)	6.1	5.8	6.1
(C/N) - Total Required	(dB)	5.8	5.8	5.8
Downlink Margin - Clear Sky	(dB)	7.6	7.7	9.4
Downlink Margin - Rain Down	(dB)	0.3	0.0	0.3
Downlink Availability	(%)	99.96	99.98	99.92